

## TITLE OF INVENTION

CHILD RESISTANT PACKAGE WITH PALM OPEN FEATURE

## FIELD OF INVENTION

This invention relates to child resistant packaging (CRP) for household products especially pills and capsules. That is, safety packaging having features that make it difficult for most children to open yet is easily opened by most adults. While this invention is directed at products that require CRP it is not limited to these products.

## BACKGROUND OF THE INVENTION

The United States Consumer Product Safety Commission (CPSC) requires that certain products for household use be packaged in safety packaging or as it is commonly called child resistant packaging. Prescription drugs and certain over the counter (OTC) medications are among the products regulated. The child resistant packaging used for packaging pills and capsules in the U.S. is composed of reclosable packages consisting of containers and closures; and single use packages such as blister packs.

Most of the reclosable child resistant packages have a closure that has a sidewall depending from the periphery of the top panel. This closure sidewall is gripped by the consumer during the process of removing and or replacing of the closure from the container. While this sidewall is essential for operation of all of this type of child resistant packaging, it also provides children with a surface that they can grip with their hands or teeth to remove the closure from the container.

One such package consisting of a container and a closure with sidewall is shown in patent #5,711,442 issued to Kusz. This particular package has an exposed sidewall intended to be gripped by the consumer to rotate the closure while opening or closing the package.

An appendage on the side of the container provides the child resistant feature and must be manipulated to allow the closure to be rotated for removal.

Another type of child resistant packaging has a plug style closure that requires the use of a unique tool to remove the plug from the container. One such package is shown in patent #5,437,382 issued to Gluckman. This patent depicts a container, a plug, and a closure.

The closure is threaded on the container covering its mouth, while the plug is threaded

into the mouth of the container to a position below its top plane. The closure also has a tool integral with its top surface. To open the package one must remove the closure, invert it, insert it into the container opening, and rotate it to align the tool with plug, and unscrew the plug from the container. A disadvantage of this package is that a consumer could close the package by merely replacing the closure, but not the plug, thus having a package that is not in its original child resistant state.

#### BRIEF SUMMARY OF THE INVENTION

The object of the present invention is to provide a child resistant reclosable package consisting of two parts, a container and a closure, that depends upon the differences in cognitive skills between adults and young children to be effective. This package is child resistant because of its unique design that does not have an exposed [area] sidewall on the closure that can be gripped when the closure is properly applied on the container. The closure top surface is the only area of the closure that is exposed on this package. Most children lack the cognitive skill necessary to comprehend and act out a method for opening this type of package while most adults can easily accomplish this with minimal written or pictorial instruction. This will become obvious as one becomes familiar with the design and operation of this package.

The container is anticipated to look like a vial composed of a generally cylindrical sidewall with an integral bottom at one end and an opening at the end opposite the bottom. The container side wall has an increased interior diameter, at its opening, to accommodate the closure top panel. The closure is composed of a top panel that preferably has a convex top surface, and a relatively flat bottom surface having an integral depending sidewall, that is meant to be inserted into the container. The top panel has a side surface at its periphery that extends from the top surface to the bottom surface. When the package is closed the outer surface of the closure top panel is slightly above, below, or at the plane of the container opening; thus having [little or] no side surface, of the top panel, exposed. Existing child resistant packages have a closure with an exposed sidewall that is intended to be gripped by the consumer for the purpose of opening and or closing the package. Because the closed package in this invention does not have an exposed closure sidewall that can be gripped, it relies upon frictional engagement

between the palm of a consumers hand and the closure top panel, to rotate the closure, with respect to the container, for the purpose of removing it from the container. Specifically, to open the package, the consumer places the palm of one hand on the closure and rotates this hand in the counter clockwise direction, while the container is kept stationary with the other hand. This action causes the closure to be unscrewed from the container. Pressing one's palm on the top of the closure is specifically for the purpose of frictional engagement and is not used to move the closure axially toward the container to engage or disengage any appendage or mechanism used to provide child resistant means as is the case with many inventions in the prior art on child resistant packaging. The cooperating means used for [attaching] retaining the closure [to] in the [vial] container can be located on the outer surface of the closure sidewall; and on the inner surface of the vial sidewall at or near its opening. [Such means, could be cooperating screw threads on the closure and container such that rotating the closure with respect to the container is the action necessary to open or close the package.] Screw threads are an example of means that can be incorporated. The upper surface of the closure thread in intimate contact with the lower surface of the container thread would provide means for retaining the closure in the container. While screw threads are a common and effective means for retaining a closure on a container this invention is not limited to the use of screw threads.

Alternate means such as engaging beads on the inner surface of the container and an external surface of the closure could be used to retain the closure within the [vial] container.

To open the package there must be means for elevating the closure with respect to the container. Such means could be cooperating screw threads on the closure and container such that rotating the closure with respect to the container would cause the lower surface of the closure thread to contact the upper surface of the container thread causing the closure to elevate with respect to the container. Other devices could provide the required elevating means. A ramp like projection on the inner surface of the vial and a cooperating spline on the exterior surface of the closure side wall could be used to cam the closure out of engagement with the container when the closure is rotated with respect to the container. That is, when the spline on the closure is in contact with the ramp in the

container and the closure is rotated, the spline will elevate as it moves up the ramp, thereby moving the closure upward at this location, thus moving the closure and container retention means out of engagement. Once the closure has been rotated a sufficient number of degrees as to elevate [it] the periphery of the closure top panel above the plane of the container opening, one could now have a sufficient amount of the closure top panel exposed so that they could now lift the closure from the container.

Another possibility would be to have more than one ramp and or spline arranged in such a manner so as to completely cam the closure off of the container when the closure is rotated.

Another version of the retention means could employ the periphery of the closure top panel and an internal bead on the container near its open end, along with a ledge, slightly below the bead, upon which the bottom surface of the closure top panel could rest. The container bead and the ledge below the bead would have an internal diameter that is less than the outer diameter of the closure top panel. Closing the package would consist of inserting the closure sidewall into the container until the closure top panel passes under the container bead and rests on the container ledge. Removal of the closure from the container could be accomplished by mechanical action of the elevating means such as the cooperating screw threads, or the spline and ramp discussed previously. One can easily comprehend that a great many variations in the construction of this invention can be made by those skilled in the art and still remain within the scope of this disclosure.

Pictorial or written instructions on the method to be used for opening the package may appear on the package. While it is intended that instructions for opening the package be included with the package, it is anticipated that most consumers could open the package before reviewing the instructions because of their conditioning for pushing and turning a child resistant closure to remove it from a container.

Since the closure lacks an exterior sidewall the amount of torque that can be exerted upon it during the application process would be limited by the frictional contact between the application medium and the top surface of the closure, to a relatively low level. Because of the relatively low level of application torque, the amount of removal torque required to loosen and remove the closure will also be relatively low. These relatively low levels of

application and removal torque required to use the package, will translate into a consumer friendly package.

While it is anticipated that the majority of consumers would be capable of opening the package by frictional engagement between their hand and the top of the closure, not all consumers may be capable of accomplishing this task. To aid these consumers a slot is formed in the top panel of the closure. This slot is of such dimension that a tool such as a coin or key, for example, can be partially inserted into the slot for the purpose of using the tool for rotating the closure to remove it from the container.

The surface of the closure top panel may be smooth or have projections and or depressions to enhance the degree of frictional contact of the closure by the consumer.

The [preferred] means for retaining the closure in the container and removing the closure from the container are expected to be screw threads on the closure and in the container; or a combination of screw threads on the closure and container and a bead at the container opening cooperating with the periphery of the closure top panel; or an inclined surface on the interior of the closure sidewall near its open end and a bead at its open end cooperating with a spline on the sidewall and the periphery of the closure top panel, respectively. Any of the three options can be incorporated in reduction to practice.

There may be a single thread on both the closure and container or there may be multiple threads on each without detracting from this disclosure.

A sealing system composed of contact between surfaces on the closure and vial, for the purpose of preventing the ingress and or egress of air, moisture, or other substance, can be added by those skilled in the art, and still remain within the scope of this disclosure.

The preferred version of this disclosure utilizes screw threads for both elevating the closure with respect to the container and retaining the closure within the container and having the container capable of accommodating and retaining the periphery of the closure top panel at its opening.

## DESCRIPTION OF DRAWINGS

FIG. 1 is a [side] perspective view of the package showing the container and closure.

FIG. 2 is a top view of the package showing the closure inserted into the container.

FIG. 3 is a side view of the closure showing its top panel and depending sidewall.

FIG. 4 is a section as shown in FIG. 2 along line 4-4.

FIG. 5 is a [perspective view of the package showing the closure and container] section view enlarging the area within circle B in FIG. 4.

FIG. 6 is a top view of the container showing an alternative ramp construction.

FIG. 7 is a sectional view of the container shown in FIG. 6 along line 7-7

FIG. 8 is a side view of the closure used in the ramp construction with the spline in front.

FIG. 9 is a side view of the closure used in the ramp construction with the spline on the side.

FIG. 10 is an enlarged view of the area within circle A in FIG. 7.

## DETAILED DESCRIPTION OF THE INVENTION

Referring to drawing FIG.S 1-5 shows the preferred version of this package 1 being composed of container 2 and closure 3. The container 2 is composed of a base 13 integrally connected to generally cylindrical sidewall 11 that is integrally connected to the upper generally cylindrical sidewall 10 via generally conical transitional wall 5. The upper sidewall 10 is larger in diameter than the lower sidewall 11 and screw thread 9, for [retaining] cooperating with a thread on the closure, is contained on its inner surface. One can visualize a groove in the interior surface of upper sidewall of the container, at its opening as in FIG.5, forming bead 28 and ledge 21 as also shown in FIG.10. When the closure is applied to the container such that the periphery of the top panel 12 cams past the bead 28 and a portion of bottom surface 14 rests on ledge 21, the closure 3 will be retained within the container. If bead 28 in FIG. 5 is not present, the only device providing retention means will be the cooperating threads 6 and 9 on the closure and container respectively.

The closure 3 is composed of a generally circular top panel 13 that is smaller in diameter than the outer diameter of the container upper sidewall 10; has a flat lower surface 14 and a convex upper surface 12 with these two surfaces joining at the periphery of the closure,

forming the side of the top panel. The sidewall 4 depends from and is integral with the lower surface 14. This closure sidewall 4 is generally cylindrical with its external surface being smaller in diameter than the interior of container sidewall 10 and it contains a screw thread 6, protruding from its surface, which cooperates with container screw thread 9 to move the closure vertically with respect to the container and to retain the closure within the container. The bottom surface 7, of the closure sidewall 4, is generally conical in cross section as it connects the outer and inner surfaces of the sidewall. Contact between the inner surface of container transition wall 5 and closure bottom surface 7 is anticipated as being capable of sealing the package when the closure is applied to the container. Additional areas for sealing of the package can occur where ever continuous contact between closure exterior and container interior exist. For example the area of contact between the bottom surface 14 of the closure top panel and the ledge 21 on the container as illustrated in FIG. 5.

The closure 3 is applied to the container 2 by grasping the closure at its periphery, inserting it partially into the container, and rotating the closure with respect to the container to engage their screw threads. When closure screw thread 6 has become engaged with container screw thread 9 the consumer can complete application of the closure by using their palm to contact the convex surface 12 and rotate it in the clockwise direction until the closure is fully applied. Fully applied can be defined as being when the periphery of the top panel is below the container top surface 29 and the top panel bottom surface 14 contacts the container ledge 21 and/or the lower surface 7 of the closure sidewall contacts the container sidewall 5. Removal of the closure 3 from the container is the reverse of the application process. The consumer presses their palm against the convex upper surface 12 of the closure with sufficient force such that rotating ones hand in the counter clockwise direction will loosen and partially remove the closure from the container. One can [then] grasp the closure 3 at its periphery and continue to rotate it counter clockwise, or they may continue to use rotation of their palm, to complete the removal process such that the closure 3 is separated from the container 2. Those consumers that find it difficult to open the package using the process described above can use a tool such as a coin inserted into slot 8 in the top panel 12 of the closure. They can then use the tool to rotate the closure 3 to open and or close the package.

While screw threads on the interior of the container 2 and the exterior of closure 3 are [the preferred retention means] are used for moving the closure within the container, alternate [means of retaining] devices for moving the closure vertically within the container are possible.

One alternate device that can be used as elevating means is shown in FIGS 6-10. [The preferred embodiment incorporates screw threads for retaining the closure within the container.] This concept consists of separate parts for closure retention, and closure elevation. The package is closed by inserting the closure 24 into the container 20 to the point where the top panel 25 cams past container bead 28 and the closure top panel bottom surface rests upon container surface 21. The interior diameter of continuous bead 28 is smaller than the exterior diameter of closure top panel 25 and thereby retains the closure within the container. To open the package the closure 24 is rotated in a counter clockwise direction using ones palm. At one point during this rotation the bottom 30 of spline 27 protruding from sidewall 26 of closure 24 will contact the upper surface 23 of cam 22 on the inner surface of container sidewall 31. Continued rotation of the closure will cause the closure to tilt and elevate with respect to the container as the spline 27 rides up cam 22 thereby moving the closure top panel 25 past container bead 28 which disengages the retention means in at least one location, allowing the closure to be [grasped] manipulated and pulled completely from the container. One could term this concept as being a "Push On - Turn Open" package; meaning that one closes the package by simply pushing the closure into the container and opens the package by turning the closure.

This is unique to child resistant packaging and unique to reclosable packaging in general to have a closure that does not have an exposed surface that can be gripped when the closure is fully applied to the container.

The container bead 28 may be continuous or segmented and the amount of overlap between the closure top panel and the bead 28 can be varied. Adjusting the amount of overlap and or having a continuous/segmented bead, will change the amount of rotational force required to move the closure top panel past the container bead 28.